Deep Space Systems Technology Program Future Deliveries

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Abstract

NASA is in a period of frequent launches of low cost deep space missions with challenging performance needs. The modest budgets of these missions make it impossible for each to develop its own technology, therefore, efficient and effective development and insertion of technology for these missions must be approached at a higher level than has been done in the past. The Deep Space Systems Technology Program (DSST), often referred to as X2000, has been formed to address this need. The program is divided into a series of "Deliveries" that develop and demonstrate a set of spacecraft system capabilities with broad applicability for use by multiple missions. The First Delivery Project, to be completed in 2001, will provide a one MRAD-tolerant flight computer, power switching electronics, efficient radioisotope power source, and a transponder with services at 8.4 GHz and 32 GHz bands. Plans call for a Second Delivery in late 2003 to enable complete deep space systems in the 10 to 50 kg class, and a Third Delivery built around Systems on a Chip (extreme levels of electronic and microsystems integration) around 2006. Formulation of these Future Deliveries (past the First Delivery) is ongoing and includes plans for such developments as highly miniaturized digital/analog/power electronics, optical communications, multifunctional structures, miniature lightweight propulsion, advanced thermal control techniques, highly efficient radioisotope power sources, and a unified flight ground software architecture to support the needs of future highly intelligent space systems. All developments are targeted at broad applicability and reuse, and will be commercialized within the US.